

**FIG. 1**

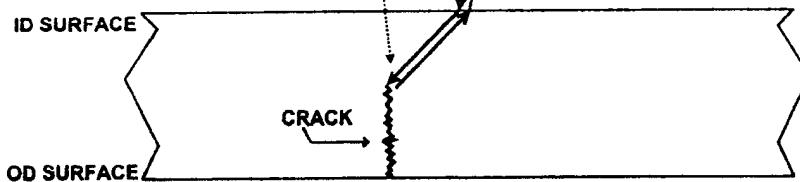
**PRIOR ART**

TIP SIZING METHOD

DIRECTION OF TRANSDUCER DISPLACEMENT

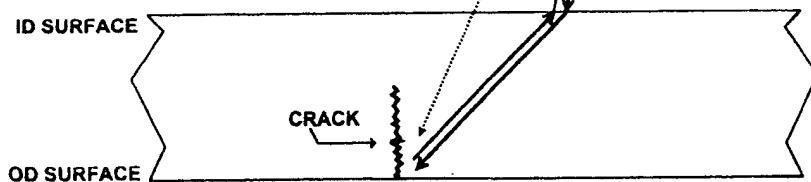
**FIG. 2**

**PRIOR ART**



DIRECTION OF TRANSDUCER DISPLACEMENT

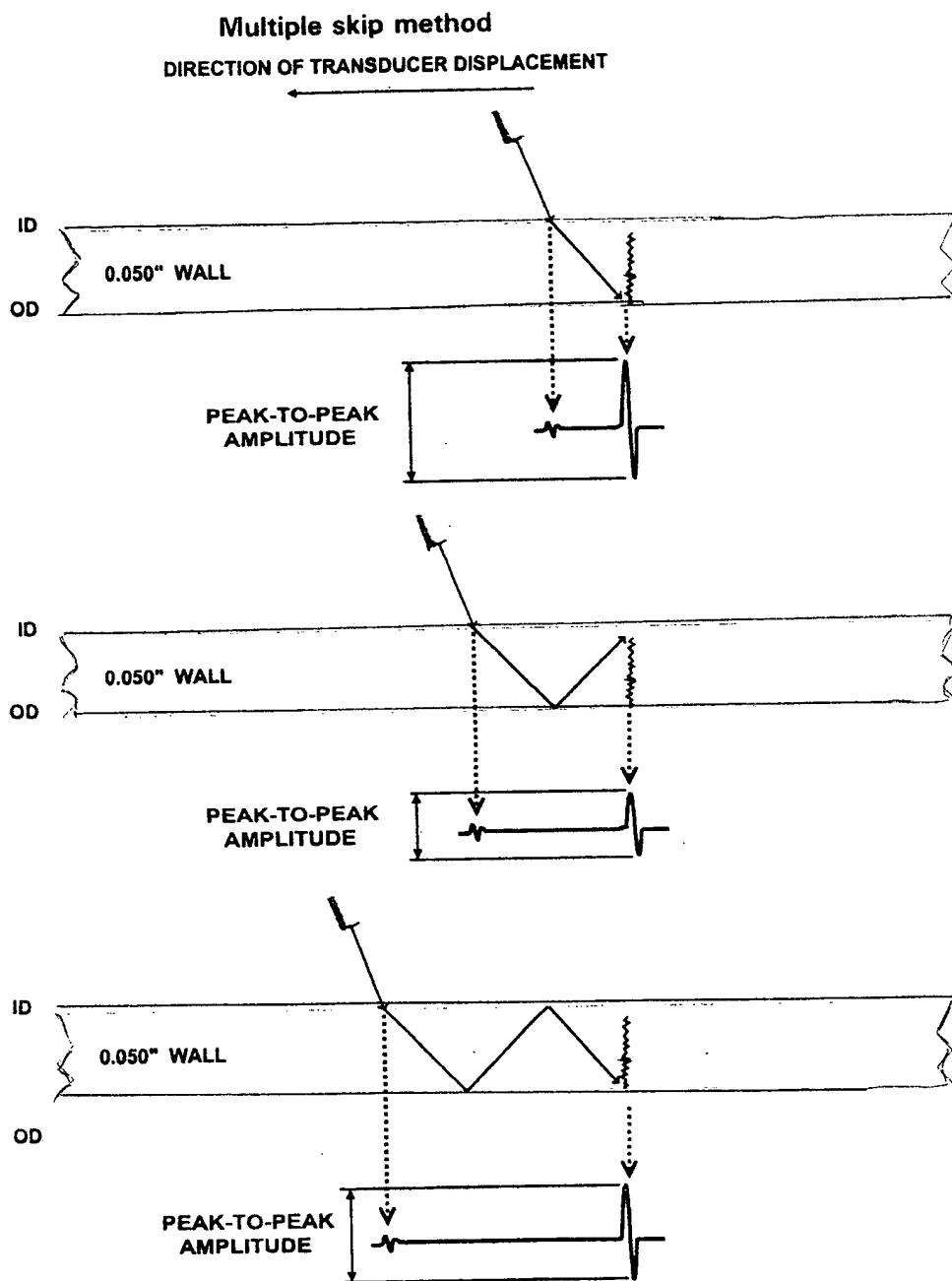
CORNER REFLECTOR DETECTION





## **FIG. 3**

### **PRIOR ART**



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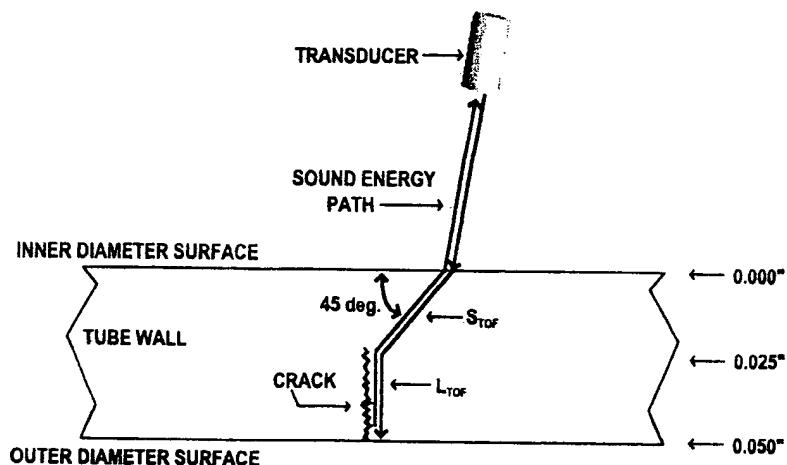
## FIG. 4

TABLE 1  
MODE CONVERTED SIGNAL SIZING RESULTS

NOTCH DEPTH	UNCORRECTED UT DEPTH ESTIMATE (based on TM TOF)	TM TOF DEPTH ERROR	UNCORRECTED TOF DEPTH PREDICTION	CORRECTED TOF DEPTH PREDICTION (* 1.6 factor)	MCS CORRECTED DEPTH ERROR
0.045	0.026	0.019	0.028	0.042	-0.003
0.040	0.024	0.016	0.025	0.038	-0.002
0.035	0.022	0.013	0.022	0.035	0.000
0.030	0.018	0.012	0.019	0.029	-0.001
0.025	0.016	0.009	0.016	0.026	0.001
0.020	0.012	0.008	0.013	0.019	-0.001
0.015	0.008	0.007	0.009	0.013	-0.002
0.010	0.005	0.005	0.006	0.008	-0.002

## FIG. 5

MODE CONVERSION METHOD EXAMPLE





## FIG. 6

TABLE 2  
COMPARISON OF CONVENTIONAL TOF ANALYSIS  
TO MCS ANALYSIS

	Mode Converted Correction Analysis	Conventional UT TOF Analysis
Average Error	-0.001 inches	-0.011 inches
Error Standard Deviation	0.001 inches	0.005 inches
Maximum Under-call	-0.003 inches	-0.019 inches
RMSE	0.002 inches	0.012 inches
Lower 95% Confidence Limit	-0.003 inches	-0.019 inches

## FIG. 7

TABLE 3  
TYPICAL FULL SKIP NORMALIZATION VALUES

PROBE: PP5-8		FOCAL POINT: ID SURFACE		
REMAINING WALL@ EDM (inch)	1/2 SKIP (A/D Counts)	1 SKIP (A/D Counts)	1 & 1/2 SKIP (A/D Counts)	NORMALIZED RESULT
0.005	168	135	137	0.89
0.010	159	92	96	0.72
0.015	144	74	84	0.65
0.020	151	46	82	0.39
0.025	125	36	99	0.32
0.030	113	17	74	0.18
0.035	96	N/A	72	-
0.040	82	N/A	38	-
0.045	46	N/A	44	-



## **FIG. 8**

**TABLE 4**  
**FSN VS REMAINING WALL**

SAMPLE INDEX	FSN VALUE	Regression Estimate (inch)	Actual Remaining Wall (inch)	Delta (inch)
47 100	.89	0.003	0.000	-0.003
47 135	1.16	0.000	0.000	0.000
57 298	.32	0.021	0.028	0.007
57 305	.73	0.008	0.005	0.003

## **FIG. 9**

**UT OD INITIATED CRACK SIZING LOGIC**

